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EUCALYPTUS IMLAYENSIS, A NEW SPECIES FROM A MOUNTAIN OF SOUTH COASTAL NEW SOUTH WALES

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ABSTRACT

Crisp, M. D. (National Botanic Gardens and Herbarium, P.O. Box 158, Canberra City, Australia 2601) and Brooker, M. I. H. (Division of Forest Research, CSIRO, P.O. Box 4008, Canberra City, Australia 2601) 1980. Eucalyptus imlayensis, *a new species from a mountain of south coastal New South Wales. Telopea 2 (1): 41–47, figs 1–3.*— A new species of *Eucalyptus* (Myrtaceae) from Mt Imlay south-west of Eden, New South Wales is described. Its natural affinity, restricted distribution and habitat are discussed. It is considered to have affinity with both mainland Australian and Tasmanian species.

INTRODUCTION

In October 1977 a National Botanic Gardens party of M. D. Crisp, I. R. Telford and J. Pyne discovered, near the summit of Mt Imlay, near Eden, a small population of about 70 mallee eucalypts believed then to have affinity with *E. baeuerlenii* F. Muell. but which were easily distinguished from it and any other known species. When re-examined a few months later, the population was found to be uniform. So also were progeny grown in Canberra from seed collected from the natural population, making hybrid origin unlikely. It was concluded that this population, while extremely small, represented a new species.

Eucalyptus imlayensis *M. D. Crisp et M. I. H. Brooker*, **sp. nov.**

(Figs 1; 2; 3: 1–2.)

Frutex "mallee" ad 7 m altus, cortice laevi; canopio denso, lignotuberum formans; non glaucus. *Cotyledones* bilobae vel reniformes. *Folia plantulae* sessilia, decussata, elliptica vel ovata, 3–6 × 1.5–2.5 cm, viridia vel atrovirentia, leviter crenulata, manifeste glandulifera, nitentia. *Folia adulta* petiolo ad 1.5 cm longo, non-opposita, lanceolata, 10–15 × 1.5–2 cm, crassa, plus minusve erecta, dense reticulata, glandulis obscuris. *Inflorescentiae* axillares pedunculis brevissimis, 3-florae. *Alabastra* ad 0.7 × 0.4 cm; hypanthium obconicum vel sub-urceolatum; operculum conicum vel leviter rostratum. *Ovarium* 3–4 loculare. *Fructus* sessiles vel pedicellis brevissimis, ad 0.7 × 0.7 cm valvas includentes; discus prominens; valvae deltatae, exsertae. *Semina* atro-cinerea vel nigra hilo ventrali.

Holotype: summit of Mt Imlay, 20 km SW of Eden, New South Wales, 37° 11′ S, 149° 44′ E, *M. D. Crisp 4021, I. R. Telford & S. I. Parker*, 16.5.1978, 3 sheets (CBG). Isotypes: A, BISH, FRI, HO, K, L, MEL, NSW.

Fig. 1. *Eucalyptus imlayensis* (foreground) showing individual plants emergent above tall closed heathland.

A *mallee* to 7 m tall; bark smooth, decorticating in broad strips or ribbons, greenish when freshly exposed, weathering through orange-brown to grey; canopy dense, with leaves clustered towards ends of branchlets; forming a lignotuber; non-glaucous. *Cotyledons* bilobed or reniform. *Seedling-leaves* sessile, decussate for many nodes, elliptic to ovate, 3–6 × 1.5–2.5 cm, green to dark green, somewhat glossy, slightly crenulate, prominently glandular including margins; seedling axis square in transection with edges prominently winged and glandular (Fig. 3: 1). *Juvenile leaves* similar though larger, proportionally broader, sessile, green, obtuse, crenulate, sometimes abruptly acuminate. *Intermediate leaves* petiolate, not opposite, broad-lanceolate, ± obscurely crenulate, 6–13 × 1.5–3 cm, green, thick. *Adult leaves* on a short, strongly flattened petiole to 1.5 cm long, not opposite, lanceolate, falcate, 10–15 × 1.5–2 cm, green, thick, held somewhat erect; densely reticulate and with few, minute, non-conspicuous oil glands (Fig. 3: 2). *Inflorescences* axillary on very short peduncles to 0.5 cm long; buds 3, up to 0.7 × 0.4 cm; middle bud shortly pedicellate; lateral buds ± sessile. *Hypanthium* obconical to slightly urceolate; operculum conical or slightly beaked, about equal in length; outer operculum deciduous early. *Staminal filaments* flexuose and most finally inflexed. *Anthers* dorsifixed, cuneate to oblong in outline, opening in longitudinal slits, 0.5 mm long. *Ovary chambers* 3 or 4. *Ovules* in 4 vertical rows. *Fruit* sessile to very shortly pedicellate, up to 0.7 × 0.7 cm including valves; hypanthium cupular to sub-campanulate; disc prominent, convex; valves deltoid, exserted. *Seed* dark grey to black, almost smooth, somewhat furrowed on the dorsal side; hilum ventral with slightly raised ridges radiating from it.

DISTRIBUTION: known only from Mt Imlay, SW. of Eden, South Coast, New South Wales, where it occurs just below the summit on the E. side, at 800 m altitude.

SPECIMENS EXAMINED: NEW SOUTH WALES: South Coast: summit of Mt Imlay, 20 km SW. of Eden, *M. D. Crisp 3502 & I. R. Telford*, 25.10.1977 (CBG, FRI, K, L, MEL, NSW); ibid., *M. D. Crisp 4022–4, I. R. Telford & S. I. Parker*, 16.5.1978 (CBG, FRI, NSW); ibid., *M. I. H. Brooker 6018–22*, 2.11.1978 (FRI). CULTIVATED: AUSTRALIAN CAPITAL TERRITORY: National Botanic Gardens, seedling ex *Crisp 4021, M. D. Crisp 5668*, 19.2.1979 (CBG, NSW); Division of Forest Research, CSIRO, seedlings ex *Brooker 6018*, 13.6.1979 (FRI).

AFFINITY

The bud, fruit and seedling morphology of *E. imlayensis* place it in series *Viminales* (Pryor & Johnson, 1971). We believe it has some characters in common both with subseries *Vernicosinae* and with subseries *Viminalinae*. In the morphology of the buds and the shape, colour and thickness of the adult leaves, *E. imlayensis* resembles *E. suberenulata* Maiden & Blakely but the fruits have an ascending disc like that in *E. viminalis*. All three species have buds in 3's.

The seedlings of *E. imlayensis* can be distinguished from species in subseries *Viminalinae* by their unique combination of elliptic to ovate, obtuse leaves with crenulate margins, green (not dull) colour and winged axis (Fig. 3: 1). The lack of conspicuous oil glands in the fresh adult leaf of *E. imlayensis* is shared to some extent in the subseries only with *E. macarthurii* Deane et Maiden (Fig. 3: 2, 4–9). Five stands of *E. macarthurii* cultivated in Canberra were examined. One of these showed adult leaves with a few oil glands visible near the midrib. In general, species of the *Viminalinae* have conspicuous oil glands in the leaves e.g., *E. smithii*, *E. badjensis*, *E. viminalis* and *E. baeuerlenii* (Fig. 3: 5, 6, 7, 8, 9). The strongly developed secondary (outer) intramarginal vein of *E. imlayensis* (Fig. 3: 2) is not seen at all in subseries *Viminalinae*, except sometimes very weakly in *E. viminalis* Labill., e.g. in material from Cotter, Australian Capital Territory (Fig. 3: 7). Specimens of *E. viminalis* from Bendoc, Victoria and near Hobart, Tasmania (Fig. 3: 8) did not show this character.

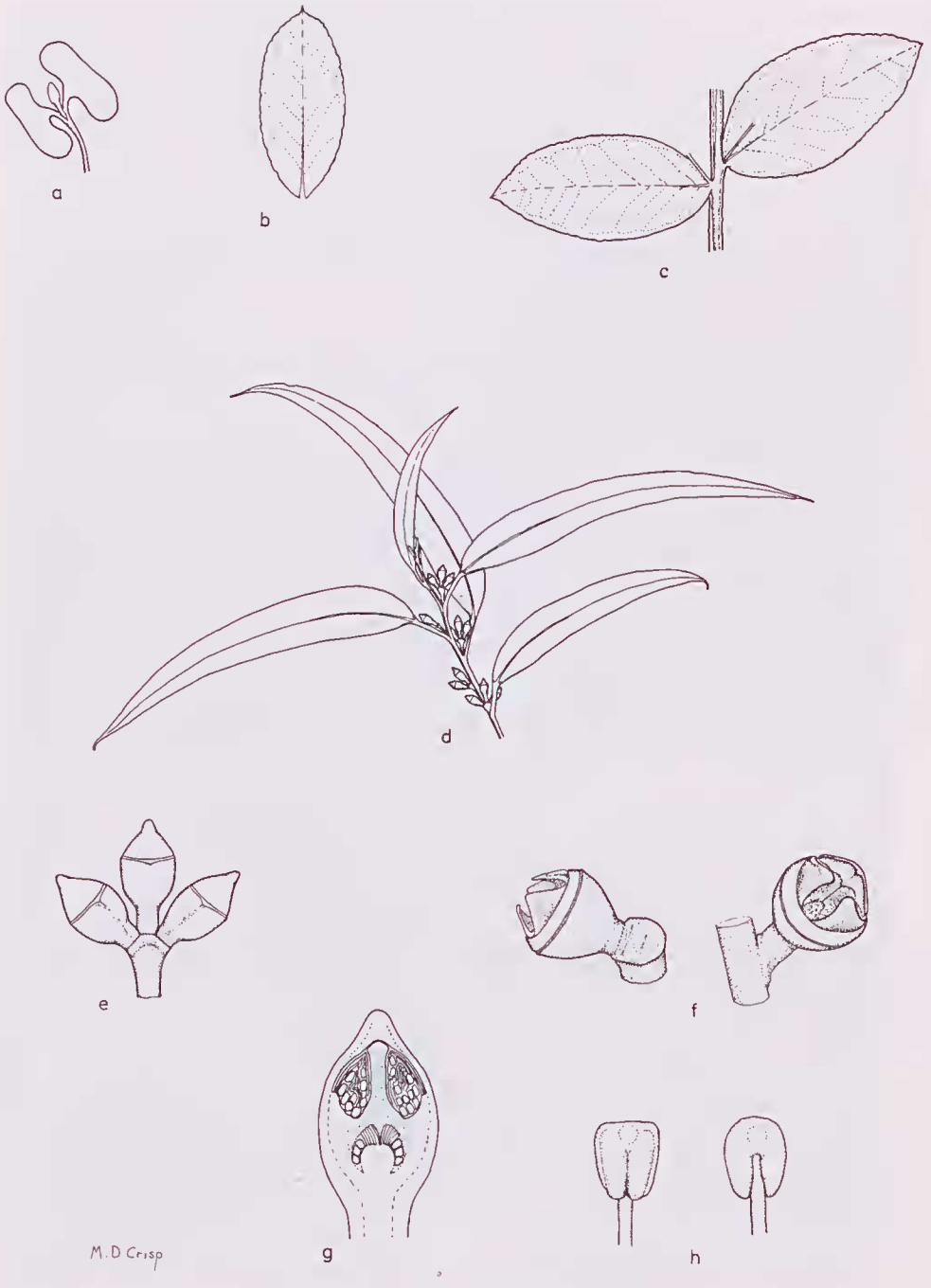


Fig. 2. *Eucalyptus imlayensis* M. D. Crisp et M. I. H. Brooker a. cotyledons, × 3. b. coppice leaf, × 0.5. c. seedling leaves, 17th pair, × 0.5. d. adult leaves with immature buds, × 0.35. e. mature buds, × 2. f. fruits, × 2. g. bud in median longisection, × 3.5. h. anthers in ventral (l.h.s.) and dorsal (r.h.s.) view, × 20. (a, d & f from *Crisp 4021*; b from *Crisp 4023*; c from *Crisp 5668*; e & h from *Crisp 3502*; g from *Crisp 4024*).

In habit and habitat *E. imlayensis* has a superficial resemblance to *E. baeuerlenii* which is a disjunctly distributed mallee with the nearest occurrence on Sugarloaf Mt, 200 km north of Mt Imlay. However, *E. baeuerlenii* differs in its narrower, grey-green seedling and juvenile leaves, wingless seedling stem, larger fruits, and buds with the operculum abruptly acuminate.

Seedlings of species in the subseries *Vernicosinae*, e.g. *E. johnstonii* (Fig. 3: 3), are somewhat similar to those of *E. imlayensis*, but the leaves of the former are yellow-green and orbicular, and the stems square in transection but not winged. In the adult leaves there is an abundance of clearly visible oil glands, and the venation is coarser, more irregular, and lacks a definite secondary intramarginal vein.

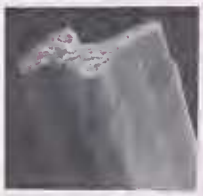
Eucalyptus imlayensis cannot be certainly placed in either the *Vernicosinae* or the *Viminalinae*. It may constitute a link between them though we prefer to place it in the *Vernicosinae* apart from the true yellow gums (*E. vernicosa* Hook. f. *sens. lat.*). We therefore suggest the code SPIJI.

The only eucalypts directly associated with the population of the new species are a few *E. sieberi* L. A. S. Johnson, mostly in mallee form. Immediately below the population is a pure stand of *E. fraxinoides* Deane et Maiden, and surrounding it on the other three sides is *E. sieberi* again in mallee form. Hence, *E. imlayensis* is isolated from the nearest species of section *Maidenaria* viz. *E. smithii* R. T. Baker which occurs deep in gullies on the opposite (western) aspect of the peak. Species within the same section might be expected to be genetically compatible but there is no evidence of hybridisation. Further, the buds of the *E. smithii* are consistently in 7's, and the leaves have clearly visible oil glands. The uniformity of the *E. imlayensis* population in the field, and of its glasshouse-grown progeny, suggest that it is very unlikely to have had a hybrid origin.

ECOLOGY

Mt Imlay is an isolated massive mountain, rising to nearly 900 m above sea level. The population of *E. imlayensis* is small. There are about 70 individuals, mostly in a small amphitheatre of about 1 ha just below the summit, with a few individuals slightly further away (K. Margus, personal communication). The site is a very steep quartzite outcrop with an easterly aspect. It receives a great deal of moisture, especially in the form of orographic cloud. Underneath the open eucalypt canopy is a tall closed heathland dominated by *Monotoca ? scoparia* (Sm.) R. Br., *Leptospermum lanigerum* (Ait.) Sm. and *Oxylobium ellipticum* (Labill.) R. Br., with *Eriostemon virgatus* Hook. f., *Prostanthera walteri* F. Muell. and *Leptomeria acida* R. Br. also common (Fig. 1). It is worth noting that *Eucalyptus vernicosa sens. lat.* occurs on similar quartzite or schist mountain-tops in Tasmania where it is emergent in heathland dominated by *Monotoca*, *Eriostemon virgatus* etc. (A. Gray, personal communication). In fact, Mt Imlay is one of the only two known Australian mainland locations of *E. virgatus*. The other is on Mt Kaye in East Gippsland, Victoria. Apparently Mt Imlay has much in common biogeographically with Tasmanian peaks such as the Sentinel Range, and those near the Great Lake.

An adjacent high ridge on the South Coast of New South Wales (Letts Mt) lacks similar heath; certainly no *E. imlayensis* was found there. Mr N. Scarlett kindly searched through material of related species in MEL for any collection of the new species from eastern Victoria, but found none.



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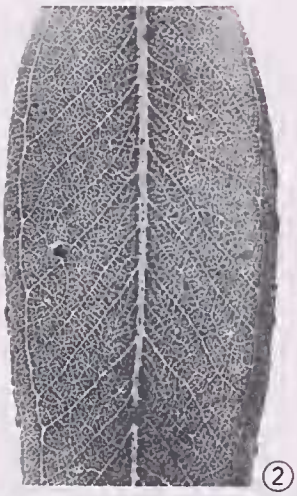

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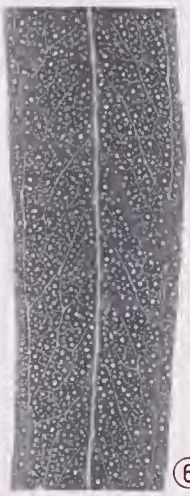

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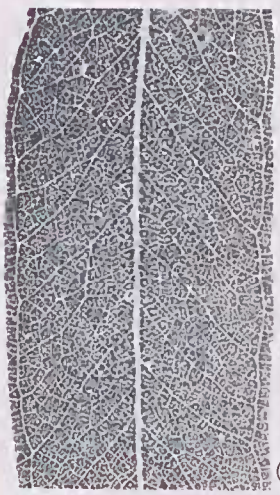

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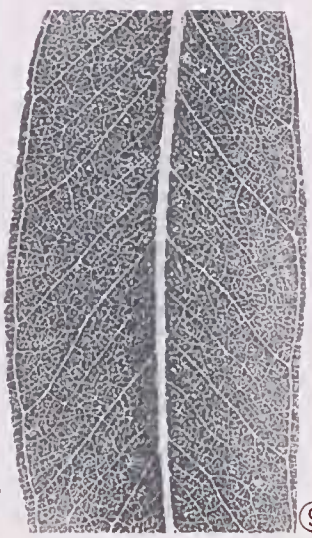

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All the plants of *E. imlayensis* have large lignotubers moulded around and between the quartzite rocks amongst which they grow. Apparently they are very old. Perhaps the population is a tiny remnant of a species declining towards extinction, due to a lack of other suitable sites or the opportunity to exploit them. It is possibly the rarest species in the genus, and must be regarded as endangered and requiring regular monitoring. Mt Imlay is in a National Park, but this alone is no guarantee of preservation. Recently two developments proposed for the summit were averted, principally because of the discovery of *Eucalyptus imlayensis*.

REFERENCE

Pryor, L. D. and Johnson, L. A. S. (1971). 'A Classification of the Eucalypts.' (Austral. Natl. Univ. Press: Canberra.)

Manuscript received 12.7.1979

Fig. 3: 1. *Eucalyptus imlayensis* M. D. Crisp et M. I. H. Brooker—transection of seedling stem under S.E.M., × 8. 2–9. Fresh adult leaves illuminated by transmitted light, × c. 2.5. 2. *E. imlayensis*. 3. *E. johnstonii* Maiden. 4. *E. macarthurii* Deane et Maiden. 5. *E. smithii* R. T. Baker. 6. *E. badjensis* de Beuzeville et Welch. 7. *E. viminalis* Labill. from Cotter, Australian Capital Territory. 8. *E. viminalis* from near Hobart, Tasmania. 9. *E. baeuerlenii* F. Muell.